

CLAIMS

What is claimed is:

1. A high-resolution display displaying an image on a screen, comprising:
an illumination optical system comprising a light source emitting a light;
an image optical system comprising an image forming device modulating the light incident to form the image;
a pixel moving optical system comprising a prism array deflecting the light from the image optical system to move pixels of the image to increase a number of pixels; and
a projection optical system comprising a projection lens projecting the deflected light by the pixel moving optical system onto the screen.
2. The high-resolution display of claim 1, wherein the image forming device is a light valve comprising a liquid crystal display (LCD).
3. The high-resolution display of claim 1, wherein the prism array is ring-shaped.
4. The high-resolution display of claim 3, wherein the image optical system further comprises a micro lens array reducing the pixels of the image formed by the image forming device.
5. The high-resolution display of claim 3, wherein the ring-shaped prism array comprises a plurality of ring-shaped prisms concentrically arranged and having slants inclined in one direction so that the modulated light is deflected in a first direction and, after the ring-shaped prism array rotates by 180 degrees, the modulated light is deflected in a second direction opposite to the first direction.
6. The high-resolution display of claim 4, wherein the ring-shaped prism array comprises a plurality of ring-shaped prisms concentrically arranged and having slants inclined in one direction so that the modulated light is deflected in a first direction and, after the ring-shaped prism array rotates by 180 degrees, the modulated light is deflected in a second direction opposite to the first direction.

7. The high-resolution display of claim 3, wherein the ring-shaped prism array comprises a plurality of fan-shaped prisms arranged around a center thereof to form a ring shape and having slants of symmetrical patterns with respect to a predetermined axis so that the modulated light is deflected in a first direction and, after the ring-shaped prism array rotates by 180 degrees, the modulated light is deflected in a second direction opposite to the first direction.

8. The high-resolution display of claim 4, wherein the ring-shaped prism array comprises a plurality of fan-shaped prisms arranged around a center thereof to form a ring shape and having slants of symmetrical patterns with respect to a predetermined axis so that the modulated light is deflected in a first direction and, after the ring-shaped prism array rotates by 180 degrees, the modulated light is deflected in a second direction opposite to the first direction.

9. The high-resolution display of claim 3, wherein the ring-shaped prism array comprises:

a first ring-shaped prism array comprising a plurality of ring-shaped prisms concentrically arranged and having slants inclined in one direction so that the modulated light is deflected in a first direction and, after the first ring-shaped prism array rotates by 180 degrees, the modulated light is deflected in a second direction opposite to the first direction; and

a second ring-shaped prism array comprising a plurality of sector-shaped prisms arranged around a center thereof to form a ring shape and having slants of symmetrical patterns with respect to a predetermined axis so that the modulated light is deflected in a second direction perpendicular to the first direction and, after the second ring-shaped prism array rotates by 180 degrees, the modulated light is deflected in a direction opposite to the second direction.

10. The high-resolution display of claim 4, wherein the ring-shaped prism array comprises:

a first ring-shaped prism array comprising a plurality of ring-shaped prisms concentrically arranged and having slants inclined in one direction so that the modulated light is deflected in a first direction and, after the first ring-shaped prism array rotates by 180 degrees, the modulated light is deflected in a second direction opposite to the first direction; and

a second ring-shaped prism array comprising a plurality of sector-shaped prisms arranged around a center thereof to form a ring shape and having slants of symmetrical patterns with respect to a predetermined axis so that the modulated light is deflected in a second direction perpendicular to the first direction and, after the second ring-shaped prism array rotates by 180 degrees, the modulated light is deflected in a direction opposite to the second direction.

11. The high-resolution display of claim 3, wherein the ring-shaped prism array comprises a plane lens having a fan shape in at least 1/3 of an entire area thereof to transmit the modulated light, and in a remaining area thereof a plurality of prisms are concentrically arranged, which comprise slants inclining in one direction so that the modulated light is deflected in a first direction and, after the ring-shaped prism array rotates by 120 degrees, the modulated light is deflected in a second direction opposite to the first direction.

12. The high-resolution display of claim 4, wherein the ring-shaped prism array comprises a plane lens having a fan shape in at least 1/3 of an entire area thereof to transmit the modulated light, and in a remaining area thereof a plurality of prisms are concentrically arranged, which comprise slants inclining in one direction so that the modulated light is deflected in a first direction and, after the ring-shaped prism array rotates by 120 degrees, the modulated light is deflected in a second direction opposite to the first direction.

13. The high-resolution display of claim 3, wherein the ring-shaped prism array comprises a plane lens having a sector shape in at least 1/3 of an entire area thereof to transmit the modulated light, and in a remaining area thereof a plurality of sector-shaped prisms are arranged around a center thereof to form a ring shape, comprising slants with a symmetrical pattern with respect to a predetermined axis so that the modulated light is deflected in a first direction and after the ring-shaped prism array rotates by 120 degrees, the modulated light is deflected in a second direction opposite to the first direction.

14. The high-resolution display of claim 4, wherein the ring-shaped prism array comprises a plane lens having a sector shape in at least 1/3 of an entire area thereof to transmit the modulated light, and in a remaining area thereof a plurality of sector-shaped prisms are arranged around a center thereof to form a ring shape, comprising slants with a symmetrical pattern with respect to a predetermined axis so that the modulated light is deflected in a first direction and, after the ring-shaped prism array rotates by 120 degrees, the modulated light is deflected in a second direction opposite to the first direction.

15. The high-resolution display of claim 1, further comprising:
a relay lens shaping the light in front of the light source to uniformly emit the light toward the image optical system.

16. The high-resolution display of claim 1, further comprising:
a color separation optical device comprising a color filter, a dichroic mirror, and a prism to separate the red, green, and blue light beams from a white light emitted from the light source so that the different color light beams travel through different optical paths.

17. The high-resolution display of claim 1, wherein the light source comprises one of a metal halide lamp, a xenon lamp, and a halogen lamp.

18. The high-resolution display of claim 1, wherein the pixel moving optical system comprises a beam steering device to quickly move the modulated light from the image optical system in horizontal and vertical directions displaying the number of pixels in a spacing among the pixels of the screen with a slight time delay, increasing the number of pixels.

19. The high-resolution display of claim 2, wherein the light valve comprises a projection or reflection liquid crystal display (LCD), a ferroelectric device, or a deformable mirror.
20. The high-resolution display of claim 2, wherein the beam steering device is rotated during the image display to achieve a high resolution.
21. The high-resolution display of claim 2, wherein the beam steering device comprises a mirror array comprising a deformable mirror device (DMD) or a galvanic mirror to change an optical path.
22. The high-resolution display of claim 10, wherein the ring-shaped prism array further comprises:
a third ring-shaped prism array in which the pixel is divided into the plurality of color light beams, and comprising first through third regions, wherein in the first and third regions, the plurality of ring-shaped prisms having the slants inclining in one direction are concentrically arranged around the center and the second region occupies 1/3 of the entire area of the third ring-shaped prism array, forming a fan shape, and is realized as a plane lens.
23. The high-resolution display of claim 10, wherein the light incident on the second region passes through without being deflected and, forms an original pixel at an original position on the screen, the light incident on the first region is deflected in the first direction, and the light incident on the third region is deflected in the second direction opposite to the first direction.